Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Previously presented) A radiation detector module including:

a scintillator arranged to receive penetrating radiation, the scintillator producing second radiation responsive to the penetrating radiation;

a detector array arranged to detect second radiation produced by the scintillator;

electronics arranged on a side of the detector array opposite from the scintillator in a path to receive penetrating radiation that has passed through the scintillator;

a radiation shield disposed between the detector array and the electronics, the radiation shield being substantially absorbing with respect to the penetrating radiation, the radiation shield including openings communicating between the detector array and the electronics;

electrical feedthroughs passing through the radiation shield openings and electrically connecting the detector array and the electronics; and

an insulating support that retains the electrical feedthroughs in an arrangement comporting with an arrangement of the radiation shield openings.

2. (Previously presented) The radiation detector module as set forth in claim 1, wherein detector array includes:

back-contact photodetectors each having a second radiation-sensitive side facing the scintillator and an electrical contacting side facing the radiation shield.

3. (Previously presented) The radiation detector module as set forth in claim 1, wherein the radiation shield is electrically insulating.

4. (Previously presented) The radiation detector module as set forth in claim 1, wherein the radiation shield is electrically conductive and the electrical feedthroughs include:

an electrical conductor; and

an insulator electrically isolating the electrical conductor from the radiation shield.

5. (Previously presented) The radiation detector module as set forth in claim 1, wherein the insulating support is part of the radiation shield.

6. (Previously presented) The radiation detector module as set forth in claim 1, wherein the electrical feedthroughs are substantially absorbing with respect to the penetrating radiation and cooperate with the radiation shield to shield the electronics from the penetrating radiation that has passed through the scintillator.

7. (Previously presented) The radiation detector module as set forth in claim 6, wherein each electrical feedthrough includes:

a widened portion that spatially overlaps a narrower portion of the corresponding radiation shield opening.

8. (Previously presented) The radiation detector module as set forth in claim 1, wherein the radiation shield includes a high-Z material.

9. (Original) The radiation detector module as set forth in claim 8, wherein the high-Z material is selected from a group consisting of tungsten, a tungsten alloy, lead, a lead alloy, a lead oxide, bismuth trioxide, tantalum, gold, and platinum.

10. (Previously presented) The radiation detector module as set forth in claim 1, wherein the radiation shield is formed of a composite material including an insulating binder and a matrix of high-Z material.

11. (Original) The radiation detector module as set forth in claim 10, wherein the insulating binder is selected from a group consisting of an organic binder, a polymeric material, and an unsaturated polymeric resin.

12. (Previously presented) The radiation detector module as set forth in claim 1, wherein each electrical feedthrough includes:

a high-Z conductor formed of a high-Z material.

13. (Original) The radiation detector module as set forth in claim 12, wherein the high-Z material is selected from a group consisting of tungsten, lead, an alloy of tungsten, an alloy of lead, tantalum, gold, and platinum.

14. (Previously presented) The radiation detector module as set forth in claim 12, wherein each electrical feedthrough further includes:

an insulating coating surrounding the high-Z conductor.

15. (Previously presented) The radiation detector module as set forth in claim 12, wherein each electrical feedthrough further includes:

at least one contact layer disposed on an end of the feedthrough that electrically communicates between the feedthrough and at least one of the detector array and the electronics.

16. (Previously presented) The radiation detector module as set forth in claim 15, wherein the contact layer includes a gold layer.

17. (Previously presented) The radiation detector module as set forth in claim 1, wherein ends of the electrical feedthroughs generally align with a surface of the radiation shield to define a flat surface.

18. (Previously presented) The radiation detector module as set forth in claim 1, wherein each radiation shield opening is slanted relative to an incoming direction of the penetrating radiation to prevent the penetrating radiation from passing through the opening.

19. (Previously presented) The radiation detector module as set forth in claim 1, further including:

a second radiation shield disposed between the detector array and the electronics, the second radiation shield being substantially absorbing with respect to the penetrating radiation;

second electrical feedthroughs passing through openings of the second radiation shield, the second electrical feedthroughs being spatially offset respective to the first electrical feedthroughs that pass through openings of the first radiation shield to prevent penetrating radiation from reaching the electronics; and

electrical connectors connecting selected electrical feedthroughs and second electrical feedthroughs to electrically connect the detector array and the electronics.

20. (Previously presented) A computed tomography scanner including:

a stationary gantry;

a rotating gantry rotatably connected with the stationary gantry for rotation about an axis of rotation;

an x-ray source mounted to the rotating gantry for projecting a cone-beam of radiation through the axis of rotation;

a tiled array of detector modules as set forth in claim 1 disposed across the axis of rotation from the x-ray source, wherein a radiation shield is disposed between the tiled array and electronics, and an isolated electrical conductor provides an electrical path between the tiled array and the electronics through an opening in the radiation shield; and

a reconstruction processor for processing an output of the electronics into an image representation.

21. (Previously presented) A method for detecting penetrating radiation traveling in a first direction, the method comprising:

in a planar region having a front face transverse to the first direction, converting most of the penetrating radiation into a second radiation;

passing the second radiation and a remainder of the penetrating radiation from a second face of the planar region;

converting the second radiation into electrical signals;

electrically communicating the electrical signals via feedthroughs in a radiation shield disposed behind the second face of the planar region to electronics disposed behind the radiation shield while absorbing the remainder of the penetrating radiation with the radiation shield, wherein the electrical signals are communicated over electrical conductors electrically isolated from the radiation shield.

22. (Previously presented) The method as set forth in claim 21, wherein the absorbing of the remainder of the penetrating radiation further includes:

absorbing penetrating radiation with the feedthroughs to prevent the penetrating radiation from reaching the electronics.

23. (Previously presented) The method as set forth in claim 21, further including:

extruding the radiation shield with the feedthroughs embedded therein.

24. (Previously presented) The method as set forth in claim 21, further including:

arranging the feedthroughs in the radiation shield such that the penetrating radiation is prevented from passing through the feedthroughs or between the feedthroughs and the shield.

25. (Currently amended) [[A]] The radiation detector module of claim 1, ~~including:~~ wherein the radiation shield is disposed atop the insulating support in a direction of the radiation.

~~a scintillator arranged to receive penetrating radiation, the scintillator producing second radiation responsive to the penetrating radiation;~~

~~a detector array arranged to detect second radiation produced by the scintillator;~~

~~electronics arranged on a side of the detector array opposite from the scintillator in a path of penetrating radiation traversing the scintillator;~~

~~a radiation shield disposed between the detector array and the electronics, the radiation shield being substantially absorbing with respect to the penetrating radiation traversing the scintillator, and the radiation shield including openings communicating between the detector array and the electronics; and~~

~~electrical feedthroughs passing through the radiation shield openings and electrically connecting the detector array and the electronics, wherein the electrical feedthroughs include:~~

~~an electrical conductor; and~~

~~an insulator electrically isolating the electrical conductor from the radiation shield.~~

26. (Previously presented) A radiation detector module including:

a scintillator arranged to receive penetrating radiation, the scintillator producing second radiation responsive to the penetrating radiation;

a detector array arranged to detect second radiation produced by the scintillator;

electronics arranged on a side of the detector array opposite from the scintillator in a path of penetrating radiation traversing the scintillator;

a radiation shield disposed between the detector array and the electronics, the radiation shield being substantially absorbing with respect to the penetrating radiation traversing the scintillator, the radiation shield including openings communicating between the detector array and the electronics, wherein each radiation shield opening is slanted relative to an incoming direction of the penetrating radiation traversing the scintillator to prevent the penetrating radiation traversing the scintillator from passing through the opening; and

electrical feedthroughs passing through the radiation shield openings and electrically connecting the detector array and the electronics.

27. (Previously presented) A radiation detector module including:

a scintillator that receives radiation, wherein the scintillator produces second radiation responsive to the received radiation;

a detector array that detects the second radiation;

electronics arranged on a side of the detector array opposite from the scintillator in a path radiation traversing the scintillator;

a first radiation shield disposed between the detector array and the electronics, wherein the first radiation shield substantially absorbs the radiation traversing the scintillator and includes openings between the detector array and the electronics;

first electrical feedthroughs passing through the first radiation shield openings and electrically connecting the detector array and the electronics;

a second radiation shield disposed between the detector array and the electronics, wherein the second radiation shield substantially absorbs the radiation traversing the scintillator;

second electrical feedthroughs passing through openings of the second radiation shield, wherein the second electrical feedthroughs are spatially offset from the first electrical feedthroughs to prevent radiation traversing the scintillator from reaching the electronics; and

electrical connectors connecting selected first electrical feedthroughs and second electrical feedthroughs to electrically connect the detector array and the electronics.

28. (New) The radiation detector module of claim 25, wherein the insulating support is a single unitary structure.

29. (New) The radiation detector module of claim 25, wherein the radiation shield forms an insert that is disposed over the feedthroughs.